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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,131	07/31/2003	David Zhang	499.752US1	1833
21186	7590	09/14/2005		
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402-0938			EXAMINER NGUYEN, THAN VINH	
			ART UNIT 2187	PAPER NUMBER

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/632,131	Applicant(s) ZHANG, DAVID	
	Examiner Than Nguyen	Art Unit 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-10 is/are allowed.
- 6) ☒ Claim(s) 1,3-5,11,12,14 and 16-20 is/are rejected.
- 7) ☒ Claim(s) 2,13 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 1-20 are pending.

#### *Specification*

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Address Translation Using A Page Size Tag.

#### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1,3,4,11,12,14,16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith (US 5,895,501).

As to claim 1:

5. Smith teaches a virtual memory management system. Smith teaches a method comprising: translating a virtual memory address into a physical memory address, the translating including, creating a first page size tag (page size entry; 4/1-5, 7/35-40); choosing an entry in a translation lookaside buffer, wherein the entry stores a second page size tag and a page frame number (page frame; 8/34-35); comparing the first page size tag with the second page size tag; and if the first page size tag is equal to the second page size tag, using the page frame number to

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form the physical memory address (look up TLB using page size to find associated page frame for address translation; 7/35-40, 8/20-23, 9/23, 11/30-35; Fig. 2).

As to claim 3,12,18:

6. Smith teaches the translation lookaside buffer is N-way set associative (10/49).

As to claim 4,19:

7. Smith teaches the translation lookaside buffer is a second level translation lookaside buffer (10/49).

As to claim 11:

8. Smith teaches an apparatus comprising: a translation lookaside buffer (TLB), the TLB including a plurality of entries, the entries including, a TLB page size tag field (page size entry; 4/1-5, 7/35-40); and a page frame number field (page frame; 8/34-35); a search list unit to transmit a page size tag based on a search list (page size register 267; 8/45); a selection logic to select an entry of the plurality of entries based on the page size tag (selector 258; 8/20-25); and a comparator to compare the page size tag with the contents of the TLB page size tag field of the selected entry (look up entry in TLB; 9/23-25; 8/20-25; 11/30-35; Fig. 2).

As to claim 14:

9. Smith teaches the comparator generates a hit indication if the page size tag matches the contents of the TLB page size tag field (page hit; 4/35-40; 9/24-25).

As to claim 16:

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10. Smith teaches a system comprising: a random access memory (RAM) unit (1/18); a processor coupled with the RAM unit (processor/ arithmetic unit; 1/18), the processor including, a translation lookaside buffer (10/49), the translation lookaside buffer (TLB) including, a plurality of entries, the plurality of entries including, a TLB page size tag field (page size entry; 4/1-5, 7/35-40); and a page frame number field (page frame; 8/34-35).

As to claim 17:

11. Smith teaches a page size encoder to produce a page size tag (7/35); a selection logic to select one of the plurality of entries of the TLB, wherein the selection is based on the page size tag (selector 258; 8/20-25); and a comparator to compare the page size tag with the contents of the TLB page size tag field of the selected entry (look up/comparator; 9/23-25; 8/20-25; 11/30-35; Fig. 2).

As to claim 20:

12. Smith teaches the plurality of entries further include a TLB global field (coherence bit; 8/25-34) and a TLB application specific identifier field (access control bit; 8/25-34).

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claim 5 is rejected under 35 U.S.C. 103(a) as being obvious over Smith (US 5,895,501).

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As to claim 5:

15. Smith teaches the page size tag being 3-bit and does not specifically teach the page size tag is represented in a 4-bit string. It would have been obvious to one of ordinary skills in the art to modify Smith's invention to have bigger sized pages (more page size bits) to allow for a more flexible memory system.

***Allowable Subject Matter***

16. Claims 2,13,15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. As to claim 2,15 the prior art does not further teach wherein the translating further includes, if the first page size tag is greater then the second page size tag, generating a miss indication.

18. As to claim 13, the prior art does not further teach wherein the search list unit is updated according to a least recently used policy.

19. Claims 6-10 are allowed.

20. As to claim 6, the prior art does not teach the method, as claimed. More specifically, the prior art does not teach comparing a first page size tag with the TLB page size tag of an entry in the TLB, wherein the first page size tag is selected from a search order list; and after determining the first page size tag is less than or equal to the TLB page size tag, writing the page frame

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number to a predetermined memory location; after determining the page size tag is greater than to the TLB page size comparing a second page size tag with the TLB page size tag of the entry, wherein the second page size tag is selected from the search order list.

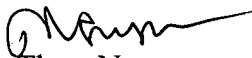
21. Claims 7-10 are allowable for incorporating the limitations of claim 6, and further limitations.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Than Nguyen whose telephone number is 571-272-4198. The examiner can normally be reached on 8am-3pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Than Nguyen can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Than Nguyen  
Primary Examiner  
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